

Comments on Draft Report Environmental Site Assessment of the Mission Bay Landfill,
San Diego, California

Barry Pulver

My approach to serving on the TAC was to provide my knowledge and expertise to help the City obtain the most bullet-proof and defensible report that they SCS could provide. After so many years of doubt, concerns, and questions regarding the risks posed by the Mission Bay Landfill the citizens needed, no deserve such a report in order to fully understand the risks, and answer the question once and for all. As such my comments are not meant to tear apart this report, but to help to become better.

I approached my review in the same manner that I have reviewed documents for work (as a consultant, regulatory, and discharger). I always start at the back to review the supporting documents to make sure the data is valid to make the interpretations in the report. As such, some people may feel that my comments are “nit picky” but they are part of the review process and the goal to make sure the report is near perfection.

I am somewhat concerned that there may be some irritation with comments on areas that were discussed during the TAC meetings. However, it should be recognized that this is the first time the TAC members have had to review the entire data set. Now that we can see how the information relates to each other we are in a better position to evaluate the data and preliminary findings and the report.

As I reviewed this report I kept thinking about the parable told by the Buddha about the blind men and the elephant. As each blind man described the elephant differently I am sure each of us will find different items to comment on. This should result in lively and interesting discussions.

One last comment. Although I have spent considerable time reviewing this report and making comments, I am sure that this is not the last of my comments. Additional comments will arise out of the forthcoming discussions. I anticipate that the discussions will be a trying time for everyone, but we should keep in mind that the end result will be an excellent document that will benefit the citizens of our City and the visitors who enjoy Mission Bay.

Text

General Comments

Where did that chemical go? - The report needs to address the apparent discrepancy between the volume of hazardous wastes discharged at the landfill and the relatively low concentrations of VOCs in groundwater and soil gas.

Description of Limits of Landfill – Somewhere in the text there should be a discussion of what is meant by the limits of the landfill. On the figures there is a colored solid line that is labeled interpreted landfill boundary (figure 1.1) or landfill delineation. It is not clear if this line represents the horizontal limits of the landfill. This definition is contradicted by soil borings that

are located within this line be do not contain waste. It is possible that there could be area within the landfill property that does not contain waste because of the irregular method used to dispose of waste. If this is the case then there should be some discussion or disclaimer to this effect.

Delineation of Landfill Limits – Based on the extensive amount of work conducted, is there any difference between the pre and post investigation landfill limits?

Section 1

Page 2 describes other environmental investigations being conducted at Mission Bay but does not discuss how this altered the planned investigation.

Because of the multidisciplinary effort taken to produce this report a list of individuals involved in the fieldwork, data interpretation, and report preparation should be listed with their responsibilities and qualifications. This list should not be limited to task leaders, but even include those who did grunt work. This would be a good presentation of the level of effort undertaken to produce this document.

Section 2

- 2.1.2 States that “a revised SCM is presented in Section 7 of the Report”. It might be a good idea in Section 7 to also discuss how the SCM changed due to the work that was completed.
- 2.2 For clarity the term groundwater monitoring wells should be used instead of monitoring wells as it is undefined as what media is being sampled.

Section 4

- P 38 States that DQOs were used in the investigation. I thought that Hiram asked for a copy of the DQOs and there were not available. The DQOs referenced in this section should be included as an appendix.

The Data Quality Assessment that is referenced in this section should be included as an appendix as it appears to be an important data validation procedure.

It is somewhat misleading to state that the TB, FB, and Dup Samples were collected during this investigation then in parenthesis state that it was only for groundwater samples analyzed for metals. Should state that ...were collected during the metals analysis groundwater sampling event...”

Statement that FB, TB, and duplicate sample are presented on Table 4.21. There are four duplicate samples presented on this table, DP1, DP2, DP3, and DP4.

For a project of this magnitude and importance I am surprised that there is not a more detailed section on data validation. This would include an assessment made by SCS on

all the QA/QC testing done by the lab, and evaluation of holding times, and a discussion of any variances and flags and how it might affect the data.

P 40 Would be nice to include copy of H&S Plan as appendix.

States that LFG may be generated during the investigation procedures. Probably better to state that LFG could be released or encountered during the investigation (I don't think that the work would generate LFG).

Could air monitoring records be included in appendix?

P 58 States that Unified Soil Classification System was used to describe soil samples. However, the descriptions of some of the samples are not consistent with this method.

P 61 Groundwater grab samples are a reconnaissance sampling technique. As such it may not be appropriate to compare them to PHGs, Ocean Plan, and PRGs.

P 70 Groundwater sampling from wells. The results of the stratification study indicates the presence of a halocline with an active shallow zone and a deep stagnant zone. On page 161 there is a recommendation to reset the depths of the wells to sample the shallow active zone. Were the samples collected from the wells, the data which was used in the HRA collected from the shallow active zone? If not, should the wells be resampled and the risk assessment redone?

P 79 The report states that the well survey was conducted by a licensed land surveyor. However, the well survey report included in Appendix 4.20 does not indicate that it was conducted by a licensed land surveyor. It does list the company but not the name or license number of the licensed land surveyor.

Section 5 Did not review

Section 6

P 91 The report states that the lateral limits of the landfill is depicted on Figure 6.1. Not really. There is a yellow line that is labeled "Landfill Delineation" and isoconcentrations of estimated thickness of trash, with intervals of 15', 10', and 5'. There is no line depicting 0' or edge of landfill. There are borings located outside of the 5' thickness interval and the yellow "Landfill Delineation" line that are noted to have no trash. This map does not clearly indicate the horizontal limits of the landfill.

P 93 Is the average cap thickness an area weighted average or just a simple average of all the data points?

P 96 Were any grab groundwater samples collected from within the area of saturated refuse?

It is stated that groundwater levels are affected by the saturated refuse. In what way are groundwater levels affected and what is the mechanism for it?

With all the information obtained from the tidal study, the storm event study, and the salinity gradients can any opinions regarding the placement of the wells and the screened intervals be made whether the wells are ok or if additional ones are needed?

- P 97 The reference to section 4.16 for additional details and analyses specific to the tidal monitoring is incorrect. Section 4.16 is titled *Disposal of Investigation-Derived Waste*.
- P 100 There is a discussion of COPCs and that the only COPCs detected were metals. It is stated that on page 118 it was stated that the arsenic CHHSL is below the detection limit used for the surface soil sampling. Even if arsenic was not detected it could be present in concentrations that exceed the CHHSL.
- P 101 Conventional wisdom is that landfills run out of organic matter to produce methane within 30 years of closure. This landfill seems to still be producing methane and was closed 46 years ago. Is the landfill gas model applicable to the unique nature of this landfill? Did the landfill gas model reproduce known conditions at the landfill for gas generation?
- P 102 What is the purpose of the discussion about what is put into municipal landfill? I thought the purpose of this investigation was to look at the Mission Bay Landfill not municipal landfills in general. There seems to be significant historical data to suggest that a lot of industrial waste was deposited at the Mission Bay Landfill.

In order to estimate what might leak out it is important to know what is in the landfill.

“Non-native substances”? Do you mean waste, trash, refuse?

I believe if there is a leak from the landfill into surface or groundwater the Regional Board will call it a discharge.

- P 103 The statement that “the ability to monitor any significant release of hazardous contaminants is the way by which all modern landfills are scrutinized” is a simplification. Firstly, not only are “hazardous contaminants” (I assume this means solvents, pesticides, and the usual man-made chemicals) but inorganic compounds and the byproduct of decomposition, such as chloride, are used. Furthermore, statistical evaluations are frequently used to determine whether a detection (not only significant detections but also minor detections) are needed to determine if a discharge had occurred and the landfill failed.
- P 108 I thought there was a DNA study completed within the past several years that suggested that the high fecal coliform was from seagulls. You might want to contact Art Coe or Pete Michaels of the Regional Board to find out about this.

- P 108 The discussion in Section 6.6 does not really show that HVOCs have rarely been detected or below drinking water standards.

Section 7

- P 111 Listed figures should be in numerical order
- P 111 Figure 6.1 is referenced to show thickness of refuse and fill within the landfill. However, the title of the figure is “Estimated Landfill Waste Thickness” and explanation only references refuse thickness. Should use consistent terminology.
- P 111 Figure 6.4 is referenced to show elevation of base of waste but figure references elevation of base of waste. Should use consistent terminology.
- P 111 Figure 6.8 is referenced to show methane and hydrogen sulfide concentration recently measured. These measurements were made over a year ago. Is recently the correct term to use or should the date of the measurements be given?
- P 118 The report states that the arsenic CHHSL is below the detection limit for arsenic used in this investigation. Is it possible to use lower detection levels? Is so, why weren’t they used? Did the DQOs address this?

Although the concentration of naturally occurring arsenic may exceed the CHHSL for arsenic, and that both the US-EPA and the CAL-EPA will not require cleanup beyond background, the City, as the property owner, has an implied if not explicit responsibility to make sure that areas that they allow public access is safe or at least the public is notified of the potential hazard. For example, riptide signs and warning are common at our beaches, as well as rattlesnake warning signs at trail heads. A better safe than sorry approach (wink, wink, nudge, nudge – the Precautionary Principle) might warrant a discussion here.

Furthermore, this US-EPA policy may be changing in light of recent events regarding the cleanup of naturally-occurring asbestos in El Dorado Hills, California (<http://yosemite.epa.gov/r9/r9press.nsf/268400f6f4b727f288256b6100659fe6/4e29a6f27b6c41bb88256ef4007a04c0!OpenDocument>). I am not familiar with all the aspects of this cleanup action, or the effect that it might have on other sites where a naturally occurring substance is associated with a human health risk, but I think that it would be within the bounds of the Precautionary Principle to evaluate what effects changing regulations and policies may have decisions that will be made at this site.

- P 119 I recall that the APCD limited their testing to what they referred to as Toxic compounds, which I recall were VOCs. The statement that only “trace concentrations of toxic compounds were detected” can be interpreted to mean that methane and sulfur dioxide (which has been raised as concern) was not detected, but I think they were not tested for. If my understanding is correct this section should be re-written.

Didn't the APCD state that the detected "toxic compounds" (I encourage not using the term toxic as it commonly misused) at the site were not greater than the background ambient air sampling station in Kearny Mesa. The discussion of results should include this comparison.

The report stated that "localized hot spots of toxic compounds did not exist at the surface of the landfill." Are there regional or large areas of hot spots of toxic compounds?

The report states that "the air above the surface of the landfill consists mainly of oxygen and nitrogen and some carbon dioxide." If nothing else the money spent on this project is well worth it to find out that the air above the landfill consists mainly of oxygen and nitrogen and some carbon dioxide. This is truly an earth shattering discovery. Has a manuscript been sent to Science or Nature regarding this discovery? Sorry for the sarcasm, but it is funny. Rather than stating that the gases that make up the Earth's atmosphere were discovered above the landfill it would be better to state the COCs that were not detected, or at concentrations that are not an issue.

P 120 It is stated that all arsenic detections exceeded the CHHSL. On page 118 it was stated that the arsenic CHHSL is below the detection limit used for the surface soil sampling. Was the same detection limit used for the sediment samples? If so, a similar disclosure should be made.

Section 8

General Comments

- I did not check the calculations. It might be a good idea to include something about the QA/QC methods that were used to validate the calculations and results. Maybe have some one spot check the calculations?
- The groundwater monitoring wells were only sampled once. A lot of decisions will be made on the risk assessment that is based on a one-time sampling event. Is this acceptable to conduct a risk assessment using this one shot data? Would it be more representative to collect additional samples to confirm the results?
- Were the groundwater samples collected from the "active" groundwater zone as described in the report?

P 123 Things got a bit confusing and I lost track. Did OEHHA ever send a letter stating that they were satisfied with the responses that were sent to them and agreed with the approach?

I thought the LEA requested OEHHA review of the HHRA. Therefore their review wasn't directly requested.

New thought on pathways, what about swimmer breathing VOCs partitioning from bay water?

- P 124 Data Sources – Although it is implied, did the Risk Assessment folks make any professional opinion whether the location and number of samples collected are adequate to support the Risk Assessments. For example, rather than discrete soil vapor samples the samples were composited (each sample analyzed consisted of five discrete samples from different locations and different depths that were composited into one sample). Is this an acceptable method for the collection of soil gas samples for the intended uses and pursuant to applicable guidelines? It might be a good idea to state so in this section. Were the groundwater grab samples included in the HRA? This is typically considered a reconnaissance sampling technique only.
- P 125 Although the use of all inorganic compounds whether or not they are naturally occurring may overestimate the health risk due to the landfill, it does not overestimate the risk due to these compounds at the site to the receptors.
- P 125 Is the use of setting EPCs equal to the 95% upper confidence limit of the arithmetic mean consistent with the Precautionary Principle? Does the data distribution support the use of this statistical method?
- P 127 It is stated on page 121 that “incidental worker exposure to groundwater impossible should invasive activities occur. This could include accidental ingestion, exposure to vapors associated with groundwater, or dermal exposure.” This is not included in the exposure scenario for construction worker listed on page 127. Please explain why this was excluded.
- P 132 Bottom of Page – there is a statement “...are shown in Appendix 8.3, Tables 8.3.1 and 8.3.2...” Because there is a Table 8.3 in the text there could be some confusion whether the referenced tables were excluded. Perhaps this could be reworded “... are shown in Tables 8.3.1 and 8.3.2 included in Appendix 8.3...).
- P 132 It is stated that non-cancer risk conclusions are discussed below in Section 8.3.2. Please correct type to state correct section – Section 8.4.2 [bold added for emphasis].
- P 133 Table 8.7 is referenced for HI values. There are two rows listing Construction Worker. It is not clear why there are two rows, with two different HIs. The title of the table is Total Risks, so shouldn't there just one for Construction Worker with the total HI for all COPCs?
- P 134 Not only can methane displace oxygen indoors and be an asphyxiate; it can happen in any confined space, indoors or outdoors, such as a sump, a trench, or a pipe. The statement that this is unlikely to occur except indoors is not accurate.
- P 135 The report states that “the limited soil gas survey conducted as part of this characterization does not rule out the possibility that pockets of much higher

concentrations of hydrogen sulfide may exist in the landfill.” Does this apply to the other gases tested for as part of this investigation?

P 135 The referenced DTSC study seems to be of soil in the Los Angeles area. Did DTSC present any geographic limitations where the results of this investigation is applicable? Is the geology of San Diego and the watershed of the San Diego River similar enough to the Los Angeles area to make this assumption of the natural occurrence of arsenic valid?

P 135 Although arsenic can be eliminated as a COPC per DTSC guidance, does that mean that there is no risk due to the presence of arsenic at the site?

P 135 We get it that you have been tasked to do something out of the ordinary and it may not be easy. Yes, it is not part of a “standard risk assessment” used to risk away the problem. The action at hand is what to do with the landfill, what land use restrictions, what institutional control needed to be used, if any, to adequately protect human health and the environment. Please remove all negative editorial comments about using the Precautionary Principle and use a positive approach. Alternatively, just state that you feel it is not appropriate to use and be silent on the issue.

Exploring Alternatives to Proposed Action – Yes, there is an action, what is the City going to do to protect human health and the environment.

Placing the Burden of Proof Regarding the Relative Safety of the Proposed Action on the Proponents of the Activity – Please explain how the MB HRA is consistent with this aspect.

P 138 Uncertainty Analysis – good discussion of possible problems with the data and data evaluation. But, more importantly, how does this effect the interpretation of the data in order to make decisions on what to do next. For example, could the “considerable spatial variation in the landfill contamination” mean that there could be higher concentrations, and if so what effect might this have on the HRA?

Section 9 – Did not review

Section 10

P 155 The report states that the lateral limits of the landfill is depicted on Figure 6.1. Not really. There is a yellow line that is labeled “Landfill Delineation” and isoconcentrations of estimated thickness of trash, with intervals of 15’, 10’, and 5’. There is no line depicting 0’ or edge of landfill. There are borings located outside of the 5’ thickness interval and the yellow “Landfill Delineation” line that are noted to have no trash. This map does not clearly indicate the horizontal limits of the landfill.

P 156 The Regional Board and the LEA have regulated this landfill for some time. A water SWAT was prepared and submitted to the Regional Board. There are WDRs for this site.

Did the SWAT have any conclusions/recommendations for the Cap. Has the Regional Board or the LEA issued any requirements for the Cap?

- P 156 Would the use of the Precautionary Principle suggest that even though you feel that the Regional Board and the LEA would not require any improvements to the cap that something should be done? A 1.5 foot separation between the surface and buried trash sound low. In areas not covered by pavement rodents and other burrowing animals could dig into trash and bring the trash to the surface. If they dig into the trash the hole will be conduit for landfill gas to discharge to the atmosphere. Could some minor grading be done to even out the cap thickness?
- P 157 Any potential for gas migration along utilities? How does age and depth of landfill reduce the horizontal extent that methane can migrate? Doesn't geology have some effect, such as the permeability of the soil, are there highly permeable soils there? Rather than speculate why the Regional Board and the LEA have not required perimeter gas monitoring wells, how about asking them, they are usually present at the TAC meetings. Was an air SWAT ever done for this site?
- P 157 Don't forget the only foolproof method of preventing gas migration into buildings, don't build anything there. In many sections regarding the risk of mercury to construction workers you state that due to the high methane construction is not likely. But the section on how to protect buildings from methane seems like you think that building is possible. If you are going to use the rationale that building restrictions means that there is not complete construction worker pathway then, perhaps, you shouldn't also provide means to build on the site. Isn't there some building, maybe a restroom, built near the landfill by the boat ramp? Has anyone done methane testing there? If so, what are the results.
- P 158 The section on solvent and chromic wastes needs to be expanded to give a very strong explanation why the data collected seems to be at odds with the reported historical uses of the landfill.
- P 159 Whenever the cancer risk is presented there is a comparison to the "safe" level. I am not sure what is reason for the comparison, it either is above or below the "safe" level. The comparison shows an order of magnitude increase in the cancer risk from the "safe" level. This sounds significant.

Section 11

Agree that cap should be improved. But, it is interesting that on page 156 there are no statements that the cap needs work, in fact it sounds like the cap is just fine and neither the Regional Board or the LEA would require improvements. Why the change in heart?

What about selective removal of waste with high mercury concentrations to reduce the risk due to mercury, which seems to be a risk driver?

I can't find any information regarding the existing gas monitoring system at the landfill. Why wasn't this data included in the findings?

How about adding the new wells to the existing groundwater monitoring program.

After the wells are sampled from the "active zone" should the data be evaluated and a decision made whether to redo the risk assessments using the new data?

Why should low flow sampling methods be conducted?

Figures

Figure 4.2

- Add data to figure.

Figure 6.8

- This figure would be easier to read if the only borings/wells presented on the map are the ones where field measurements were taken.
- Add sample designations.
- Typo on note "abserved".
- The light green isoconcentration line for 45% methane is very hard to read. Please use a more distinctive color.
- There is no control for closing the 15% contour near B17, MBW-2, and MBW-3 other than not wanting it to seem to extend past the limits of the landfill.
- There is no control for closing the 30% contour near northwestern corner of the landfill other than not wanting it to seem to extend past the limits of the landfill.
- There is no control for closing the 45% contour near B17, MBW-2, and MBW-3 other than not wanting it to seem to extend past the limits of the landfill.
- Why doesn't the 15% contour include the data point to the northeast of B3?

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Tables (I understand that Tessa checked and revised the Tables. I have not had time to look at the revisions)

Table 4.1

- Title of table does not match title in Table of Contents

Table 4.6

- Title of table does not match title in Table of Contents.
- Foot note 1 states that bold indicates percentages of methane and carbon dioxide greater than 40% and 30% and concentrations of H₂S in excess of 1 ppm. What is significance of these thresholds? State so in footnotes.

APPENDICES

Appendix 1.2

Questions Oct. 11, 2004 Response Letter to Regional Board

The letter states that at least two wells will be drilled through the waste near the ends of the former channel and that samples would therefore groundwater samples would be collected from below waste. This response was provide as the rationale for not having to drill deep wells as suggested by the Regional Board to address deep vertical migration of contaminates from the landfill. As indicated on Figure 4.3 these two wells are SCS1 and SCS3. Trash is not indicated on the logs for these two wells, nor is there any indication that trash was encountered during the drilling of the wells. Because waste was not encountered in wells SCS1 and SCS3 is the City required to install deep wells to satisfy the Regional Board's concerns about deep migration.

The letter also states that it would be premature to install deeper wells until the tidal study has been completed. Now that the tidal study has been completed there should be a conclusion, based on the data to date and specifically tied to the results of the tidal study as that was stated to be the key data, in the report regarding the need for deeper wells.

The letter states that investigation will be a preliminary hydrogeologic investigation of the vertical and horizontal migration of VOCs and that the report will include recommendations for additional work if needed. The scope of work as described on pages 5 and 155 of the Report does not specifically include an investigation to the vertical and horizontal migration of VOCs. The scope does include determination/identification of the average and maximum concentrations

of any chemical contaminants and distribution within the landfill boundary. There are not specific conclusions regarding whether the extent of VOCs have been defined or if additional wells are needed.

The letter states that the stormdrains and sewer lines will be evaluated as contributing factors to the contamination in Mission Bay. Has this been done and addressed in the text?

Appendix 1.3

I am a member of the TAC as an individual, not as a representative of the County of San Diego. I attend on my own time and am not being compensated by the County for my involvement. I work extra hours to make up the time that I attend the TAC meetings. Please remove the reference to the County of San Diego.

Appendix 4.5A

Was there a cover sheet or transmittal letter with the geophysical report? The copy of the report in this appendix is undated and unsigned. Were California Professional Geophysicist involved in the work as the in-charge professional? Was one needed?

On page 7 of the geophysical report it is stated that many magnetic anomaly pairs were present and could be the result of surface features such as poles, utility boxes, etc., and that ground truthing needs to be conducted, and if they cannot be correlated with surface features or buried utilities they are interpreted to represent buried metal objects related to the landfill operation. Did the ground truthing take place and were the anomaly pairs shown to be related to surface features and/or buried utilities?

Page 8 of the geophysical report includes geologic interpretations – the types of geologic material at the site based on the results of the geophysical survey. Geologic interpretations require registered professionals.

Appendix 4.10 Soil Boring Logs

General Comments

1. Include a cover sheet with explanation of logs and USCS. This is a standard form used by many consultants.
2. Because soil boring logs, well logs, and well construction logs are included in this Appendix the title should be changed to Soil Boring/Well Completion Logs.
3. Per the text the Unified Soil Classification System (USCS) was used to describe soil samples. Grain size terms such as “pebbles” and “very fine sand” are used but are not a grain size distribution term according to the USCS.

4. Several borings (borings B1, B2, B3, B4, B8) are mapped within the limits of the landfill however there is no indication that waste was encountered in the continuous soil samples collected from the borings (B2 had possible landfill material” indicated on the log).
5. Pursuant to the report a groundwater samples was collected from several borings. However, this is not indicated on the logs, nor is there any indication of groundwater on the log. In fact, there is not indication of saturated soil encountered. The moisture content of the samples is described as ranging from moist to very moist.
6. The text states that soil samples were field screened for VOCs using a PID. However, there is no indication on the logs of the results of the field screening.
7. The logs indicate that the boring was backfilled with bentonite grout to within 1 foot of the surface than with one foot of “existing soil”. The soil boring permit application states that the borings will be backfilled with bentonite and makes no reference to the use of “native soil”. Does the method used to backfill the soil boring conform to the permit requirements?
8. The drilling company listed on the logs is H&P Mobile GeoChemistry. The drilling contractor listed on the soil boring permit application is WestHazMat Drilling. Was the DEH notified of the change in drilling companies?
9. Per text the Unified Soil Classification (USCS) was used to describe soil samples. Grain size distribution terms such as Well Sorted are used but is not a grain size distribution term according to the USCS.

Specific Comments per log.

Boring B1

1. Soil between depths of 8 to 10 feet is classified as a Clayey Silt (ML). However description is a SILTY fine to very fine SAND. Pursuant to the USCS this soil would be a Silty Sand (SM).

Boring B2

1. Soil between depths of 2 to 6 feet is classified as a ML. However description is a SILTY fine to very fine SAND. Pursuant to the USCS this soil would be a Silty Sand (SM).

Boring B3

1. Backfill Log indicates that upper foot of borehole was backfilled with “existing soil” but notation at bottom of log states that borehole was capped with asphalt (or is it asphaltic concrete?).

Boring B4

1. Backfill Log indicates that upper foot of borehole was backfilled with “existing soil” but notation at bottom of log states that borehole was capped with asphalt (or is it asphaltic concrete?).
2. Soil between 13 to 20 feet is described as fine to coarse sand by given the USCS classification of SP, a poorly graded sand, which would not be a sand that ranges in grain size from fine to coarse.

Boring B5

1. Soil between 6 and 20 feet given USCS classification of SP but discrete samples were described as Silty Sand (SM) and Clayey Silt (ML).

Did not review remaining logs.

Appendix 4.11

Chain of Custody on page 3 of 149 indicates that samples were relinquished by Karen Stackpole on 7/28/04 at 16:44 and received at the laboratory on 7/29/04 at 08:30. Who was in possession of the samples between the time that they were relinquished by Karen Stackpole and received by the laboratory?

Chain of Custody 27663 on page 49 of 149 indicates that samples were relinquished by Karen Stackpole on 8/9/04 at 17:00 and received at the laboratory on 8/10/04 at 08:30. Who was in possession of the samples between the time that they were relinquished by Karen Stackpole and received by the laboratory?

Page 70 of 149 there is a QA for surrogate recoveries for SVOCs. There are six reported surrogate recovery concentrations. Two are below the concentration limits, two are at lower concentration limits, and two are near the lower end. How does this effect the data?

Page 23 of 149, 76 of 149, and 100 of 149 lists LCS and LCS Dup concentrations as part of the QA. Why is the column titled LCS RPD % limit blank?

Chain of Custody 22257 on page 78 of 149 indicates that samples were relinquished by Karen Stackpole on 8/10/04 at 16:00 and received at the laboratory on 8/11/04 at 08:50. Who was in possession of the samples between the time that they were relinquished by Karen Stackpole and received by the laboratory?

Chain of Custody 21168 on page 79 of 149 indicates that samples were relinquished by Karen Stackpole on 8/10/04 at 16:00 but has no signature indicating receipt by lab. This should be amended and explained.

Page 99 of 149 there is a QA for surrogate recoveries for SVOCs. There are six reported surrogate recovery concentrations. Two are below the concentration limits, two are at lower concentration limits, and two are near the lower end. How does this effect the data?

Chain of Custody 21172 on page 108 of 149 indicates name of the sampler (cannot read signature) who signed as collector on 10/13/04 at 13:28. However, there is not signature for the samples are relinquished. The Chain of Custody indicates that the samples were received at the laboratory on 10/14/04 at 08:45. The Chain of Custody should be revised to clearly indicate who collected the sample, when the samples were relinquished by SCS, and if there is a time gap between the time when the samples were relinquished by SCS and received by the laboratory who was in control of the samples.

Chain of Custody 21173 on page 126 of 149 indicates name of the sampler (cannot read signature) who signed as collector on 10/14/04, but did not put down the time. There is not signature of when SCS relinquished the samples and the laboratory did not sign the Chain of Custody that they received the samples. It appears that the sample names were in error and this Chain of Custody was faxed to the laboratory to correct the error. The report should contain both Chain of Custodies. If the original Chain of Custody is not properly completed it should be amended.

Appendix 4.12

Chain of Custody indicates that samples were relinquished by Karen Stackpole on 6/16/04 at 17:00 and received at the laboratory on 6/17/04 at 08:40. Who was in possession of the samples between the time that they were relinquished by Karen Stackpole and received by the laboratory?

Chain of Custody stated that the preservative used was "cool". The soil boring permit application states that the method used to preserve samples would be to place them in an ice filled chest. There appears to be a difference between the methods used to preserve the samples as stated in the soil boring permit application and on the chain of custody. Was there a difference? If not please provide documentation that the preservation methods were the same.

Appendix 4.13

Chain of Custody 28882 on page 3 of 20 indicates that samples were relinquished by Karen Stackpole on 8/3/04 at 13:00 and received at the laboratory on 8/4/04 at 08:45. Who was in possession of the samples between the time that they were relinquished by Karen Stackpole and received by the laboratory?

The Quality Control data on page 8 of 20 does not include acceptable LCS/LCS Dup and LCS RPD % Limits. Please explain.

Pages 15 of 20, 17 of 20, and 18 of 20 lists LCS and LCS Dup concentrations as part of the QA. Why is the column titled LCS RPD % limit blank?

Appendix 4.14

Chain of Custody 27515 on page 3 of 39 indicates name of the sampler (Keith Etchells) who signed as collector on 9/13/04, but did not put down the time. There is not signature of when SCS relinquished the samples. The laboratory signed as received on 9/14/04 at 08:30. The Chain of Custody should be properly completed. If there is a time gap between the time when SCS relinquished the samples and the Laboratory received them an explanation should be given as to who was in control of the samples.

Chain of Custody 27515 stated that there were no preservatives used to for these samples. As stated in the Soil Boring Well Installation Permit Application the samples were to be preserved by placing them in an ice-filled chest. Why was this not followed?

There is a comment on pages 16 of 39 and 19 of 39 that they used "higher PQL due to matrix". How does this effect data?

Chain of Custodies on pages 22 and 23 of 39 indicates name of the sampler (Keith Etchells) who signed as collector on 9/14/04, but did not put down the time. There is not signature of when SCS relinquished the samples. The laboratory signed as received on 9/15/04 at 08:40. The Chain of Custody should be properly completed. If there is a time gap between the time when SCS relinquished the samples and the Laboratory received them an explanation should be given as to who was in control of the sample.

Chain of Custodies on pages 22 and 23 of 39 stated that there were no preservatives used to for these samples. As stated in the Soil Boring Well Installation Permit Application the samples were to be preserved by placing them in an ice-filled chest. Please explain.

Appendix 4.17

There is not time listed for sample collected from well SCS4.

Appendix 8.6

On page 3 of 4 there is a reference to Table 8.6.1 and 8.6.2 and on page 4 of 4 there is a reference to Table 8.6.4. The convention appears that the first two digits of a Table refer to the Appendix in which it is located. None of these tables are included in Appendix 8.6. However there is a Table 8.5.2 in Appendix 8.6. I am confused.

Appendix 8.7

Table 8.7.1 lists the lead in soil/dust concentration as 10.1 ug/g. Table 8.2 (text) lists the EPC for lead at 0-5 feet as 10.4 mg/kg, which is the same as 10.4 ug/g. Which one is correct? Does the calculation need to be redone?

Barry Pulver, PG

The initial email comment was addressed in September 2005 and revised tables 4.22 and 4.23 were sent to the TAC in pdf format. These revised tables are included as attachments to this document.

General Comments

1. This comment is addressed in response #4 to the comments of Dr. Huntley.
2. The outline of the landfill operations shown on the figures is based mainly on the interpreted extent of disturbance shown on aerial photographs taken in the 1957-1960 period. It is likely that this outline includes areas in which there was no actual disposal of buried waste. Aerial and ground photographs show that large portions of the area within the boundary were used for stockpiling of various types of waste material. It is not known whether burial of waste occurred in these areas of the landfill operations. In some areas included within the outline of landfill operations, aerial and land photographs show that elongate trenches were excavated and filled with waste. Such areas were noted in the late 1950s photographs of western portion of the landfill. It is possible that the soils between these trenches were not excavated. It is likely that some portions of the area of surface disturbance resulting from landfill operations were never used for the subsurface disposal of waste. Such areas may have been set aside for future use or may have been used mainly as staging areas.

This comment is also partially addressed in response #10 to the comments of Dr. Huntley.

3. Some small adjustments were made to the location of the boundary, notably just to the east of the boat basin.

Section 1

4. The other environmental investigations being conducted at Mission Bay but did not alter the planned investigation.
5. A table of the main personnel involved in the study is included as an attachment to this document.

Section 2

6. p.2 A discussion of the changes in the SCM will be included in the final report.
7. We will insert a footnote to clarify the meaning of the term monitoring well at its first usage in the report.

Section 4

8. p.38 This comment is addressed in Appendix 4.22 and in the responses #6 and #7 to the comments from Mr. Sarabia.

9. Appendix 4.22 is provided as an attachment to this document.
10. The editorial change will be made.
11. Samples DP1 through DP4 are water samples collected from the drive points installed in the sediments of Mission Bay and the San Diego River.
12. Appendix 4.22 is provided as an attachment to this document.
13. p.40 The community and on-site personnel health and safety plans were provided with the addendum to the workplan.
14. The change will be made.
15. Air monitoring data collected by SCS and the AQMD are already included in Appendices 4.6, 4.7, and 4.8.
16. p.58 The logs will be reviewed and revised for consistency with the USCS.
17. p.61 Members of the TAC specifically requested that all data collected be compared to standards such as the PHGs, Ocean Plan, and PRGs. We agree with your statements, but we included the comparisons in response to the TAC request.
18. p.70 The attached table shows the depths of the pumps and the approximate depths of the halocline, which is a gradual transition in several of the wells. The majority of the pumps appear to be set below or in the lower part of the transitional zone. Our hydrogeologist with expertise in low flow groundwater sampling states that pumps draw water from a range of depths even at low flow rates, so it is likely that mixing did occur during sampling and the samples are not representative of only one zone of groundwater. However, it would be a good idea to raise the pumps prior to the next regular sampling event so that the data could be compared. Any decisions regarding subsequent work should be reserved until after the comparison is conducted.

It should be noted that this does not apply to the metals data, because these samples were collected with single-use bailers from the shallow part of the water column in each well.
19. p.79 A revised report has been requested from the surveyor and will be included in the final report.

Section 6

20. p.91 Please see the response to Mr. Pulver's comments #1 and #2. The absence of waste does not indicate that the boring was located outside the area disturbed during former landfill operations.
21. p.93 This is a simple average.

22. p.96 Yes, samples from borings B14 (located at the edge of the area) and B16.
23. The groundwater levels during the flood events are thought to be affected by the difference in permeability of the refuse, which affects the rate of flow through the different zones.
24. It is our opinion that the new wells filled in the data gaps we observed and that the current well network will provide extensive groundwater data for the site.
25. p.97 The reference should be to Appendix 4.16 and the change will be made.
26. p.100 Please note our response to comment #9 from Dr.Gordon.
p.118 We agree with your comment. Please note our response to your comment on p.135 in Section 8.
27. p.101 Based on commonly utilized generation models, landfill gas generation declines asymptotically over the years, i.e., it theoretically never reaches “zero”. The EPA-sanctioned model used in this report is consistent with this. It shows that the MBLF is currently generating methane at about 10% of the rate it generated upon closure. It is true that many regulations call for 30-years of post-closure care at landfills, but this is based on the assumption that the small amount of gas still being generated after 30 years will somehow not be significant. However, all landfills (that we are familiar with) that ceased operations 30+ years ago are still, in fact, generating methane. Regulators are becoming cognizant of this, and it is likely that they will require most landfills to continue maintenance and monitoring functions after the initial 30-year post-closure period concludes.
28. p.102 The purpose of this discussion is to provide some level of context to hazardous materials in landfills.

In order to estimate what might leak out it is important to know what is in the landfill. To a degree, however, it is impossible to quantify everything in a landfill. That is why LFG data is important (specifically VOC content, etc.)

“Non-native substances””? Do you mean waste, trash, refuse? This is will be re-worded.

I believe if there is a leak from the landfill into surface or groundwater the Regional Board will call it a discharge. We agree that this would be the case if it was a surface/storm water release.

29. p.103 The point of this sentence was to emphasize that landfills are monitored for what comes out of them (and thereby may potentially degrade public health and the environment), not for what is inside them (which is difficult to ascertain and does not pose a direct threat if contained).

- 30. p.108 This is an interesting comment, but research regarding fecal coliform is outside the scope of our assessment.
- 31. p.108 Section 6.6 is a discussion regarding the detailed results which are described in Section 4.13.4. But section 6.6 is on p.104 and you reference p.108, so this may not answer your question.

Section 7

- 32. p.111 The list will be revised as you request.
- 33. p.111 Duly noted. The change will be made.
- 34. p.111 Duly noted. The change will be made.
- 35. p.111 Duly noted. The dates will be provided.
- 36. p.118 The arsenic CHHSL (0.24 mg/kg) is very low compared to normal background concentrations of arsenic in this area (up to 11 mg/kg). Therefore, it was considered that the standard method for arsenic analysis would be suitable because the detection limit of 0.25 mg/kg is substantially lower than the upper range of background concentrations. In addition, the CHHSL is only 0.01 mg/kg lower than the detection limit.
- 37. This comment seems addressed to the City.
- 38. p.119 We will better define HAP, VOC, NMOCs, etc. in the report, and rephrase the referenced sentence.
- 39. We will expand the discussion in this section.
- 40. We are not aware of regional hot spots of toxic compounds.
- 41. Good observation. We will rephrase this section as suggested.
- 42. p.120 Yes. The comment will be repeated in this section.

Section 8

- 43. Calculations were checked internally by staff who were independent of the MB HRA project.
- 44. Groundwater concentrations of contaminants do not change rapidly in the absence of a new source of contamination. If significant contamination has not shown up in the groundwater wells at this point it is unlikely to in the near future. Additional groundwater samples could be collected periodically to confirm this, and there is an ongoing monitoring program.

45. This is addressed in our response to Mr. Pulver's comment #18 in Section 4.
46. p.123 No. However, the OEHHA comments were incorporated into the HRA as appropriate.
47. That is our understanding as the LEA and the RWQCB are the oversight agencies for this landfill.
48. This would be considered a negligible exposure pathway. All pathways were discussed with, and agreed to by the TAC after extensive discussion.
49. p.124 Risk assessment staff were involved in the initial development of the site investigation workplan. Compositing samples is sometimes used to obtain more data at less cost. Composite samples were treated very conservatively in the HRA by multiplying the maximum concentration by the total number of composites. This is consistent with OEHHA's written comments regarding the use of composite soil gas samples.
50. p.125 Agreed. Comment noted.
51. p.125 Setting EPCs equal to the 95% upper confidence limit of the mean is consistent with all federal and state risk assessment guidance. It is consistent with the Precautionary Principle because it uses an upper-bound value of concentration to estimate risk rather than a mean or median value. Thus, it will tend to overestimate risk for most exposed individuals.
52. p.127 Potential construction worker exposure to groundwater, whether via dermal, inhalation, or oral route is a negligible exposure pathway. All exposure pathways were discussed with, and explicitly agreed to by the TAC after extensive discussion before the HRA was conducted.
53. p.132 We agree and will make this editorial change.
54. p.132 We will make this editorial change.
55. p.133 The first row of Table 8.7 is Commercial Worker not Construction Worker. Only the second row contains risk estimates for the Construction Worker.
56. p.134 We will delete "This is unlikely to occur except indoors." and replace with "This is most likely to occur in situations where there is poor ventilation, for example indoors, or in outdoor confined space situations (e.g. trenches, pipes, sumps, etc.)."
57. p.135 No. Hydrogen sulfide and methane can be generated at much larger rates due to the decomposition of organic material in the landfill. This is not true for the other chemicals tested.

58. p.135 The DTSC study did not state any geographic limitations on the applicability of the study. Based on our experience, the California agencies use about 12 ppm as the upper bound of naturally-occurring arsenic throughout California.
59. p.135 No it does not. What it means is that the users of the landfill area (based on our proposed exposure scenarios) would be exposed to about the same level of arsenic-related risk as the average person not exposed to the landfill.
60. p.135 We do not consider it inappropriate to use the Precautionary Principle for risk assessment. We are just making it clear to the reader that there are no references for the approach we have used at this site in applying it. We also do not agree that there is negative editorializing in the risk assessment regarding the Precautionary Principle.
61. According to the PP paradigm, the “action” is the activity that produced or could produce health or environmental risks. The “action” in this case, is therefore development and use of the landfill.
62. As stated in the text, Section 8.5.2., the MB HRA fulfills the responsibility of the project proponent or owner to evaluate the health risks associated with the landfill. The PP states that it is the responsibility of the project proponent or owner to prove that what it is proposing or owns is safe.
63. p.138 The uncertainly analysis section will be revised to include implications for further activities, however, most of this information is included in the recommendations section of the report.

Section 10

64. p.155 This comment was addressed in our response to Mr. Pulver’s comment #20 in Section 6.
65. p.156 To our knowledge, the SWAT did not have any recommendations for the cap. If the RWQCB had any requirements for the cap, they would have been listed in the WDR for the site. Typically SWATs do not contain recommendations for remediation/closure. At one time, the RWQCBs intended to systematically use SWATs to prioritize their scrutiny of old landfills, but that program ran out of steam (and money) in the early 90’s.
66. p.156 The TAC is already addressing our recommendation in Section 11 regarding the cap thickness.
67. p.157 Utility trench bedding/backfill can be a conduit for gas migration, if they pass through or within the gas “plume” of the landfill. Such trenches can be fitted with a “dam”, a bentonite plug at the location where the trench leaves the methane zone. Drawings of the Site and surrounding area showing the distribution of underground utilities were obtained from the City of San Diego. With the exception of the area

along Sea World Drive and the restrooms near the boat basin, there are few utilities within the South Shores area. Because much of Sea World Drive is located directly above known areas of waste disposal, it is possible that the utility trenches could serve as preferential pathways for the migration of vapors and groundwater from the buried waste. No information was reviewed concerning the depth of the utility trenches or the possibility that buried waste was disturbed during their excavation. An air SWAT was not conducted because it was not required by the local APCD.

68. p.157 Buildings have been safely constructed atop landfills, by use of gas barriers and appropriate settlement protection, or building an elevated structure. There is no reason, based on the data accumulated in this project, to suggest that building atop the MBLF cannot be appropriately mitigated, from a technical viewpoint. The document will be modified to correct any disagreement. We are not aware of methane testing conducted specifically regarding the restroom facilities.
69. p.158 This comment has been addressed in our response to Dr. Huntley's comment #4.
70. p.159 In health risk assessment it is standard practice to compare the results of the risk assessment to the negligible risk benchmark of $1E-06$ so that the reader has a frame of reference or basis of interpretation. The risk results for the Mission Bay landfill HRA do significantly exceed the negligible risk benchmark, however, most of the risk is due to a chemical (arsenic) which normally would not have been included in the risk calculations if a background screening had been done. If arsenic were screened out based on background risks would have been much closer to $1E-06$.

Section 11

71. Section 10 describes the conclusions of the current status based on our assessment, whereas section 11 provides our recommendations for future work. There was no change in heart, just a difference in the scope of the two sections.
72. Mercury is a risk driver, but only for individuals who would be exposed to the deep soils where high concentrations of mercury were found (i.e. construction workers). These soils could be removed if it became likely that construction was actually likely to occur. In addition, construction workers would be protected with the appropriate level of health and safety protection equipment based on contamination levels in the specific area of construction.
73. Additional information was not included in the findings because the existing gas monitoring system is on the Sea World property. We did refer to the system, and suggest that it be expanded.
74. Whether the new wells are added to the existing groundwater monitoring program is at the discretion of the RWQCB.

75. This comment was addressed in our response to Mr. Pulver's comment #18 in Section 4.
76. Low-flow/low-volume methods can be used to overcome many of the limitations created by traditional fixed well volume purging (i.e. purge 3 – 5 well volumes). Low-flow sampling can control sample turbidity (proven to create laboratory artifacts for certain contaminants, even when samples are filtered) and minimize sample chemistry alteration (such as by aeration) by pumping at very low flow rates from the well screen zone, avoiding disturbance to the water column in the well and minimizing stress on the surrounding formation. Also, by pumping water only from the screen zone and not drawing water from the casing above the screen (if present), the volume of water purged to achieve stable water chemistry can be reduced significantly, resulting in lower costs (less time, less waste disposal). Most importantly, however, samples obtained in this manner will best reflect the true groundwater chemistry immediately surrounding each well, rather than a snapshot of the stagnant water trapped inside a well (as in the case of no purge or passive sampling methods) or an average of the water chemistry far away from the well that may be influenced by mobilization of previously immobile particulates or contaminants (in the case of high flow rate/high volume purging).

Figures

77. Figure 4.2 The data was not added to this figure to avoid congestion but we will reassess the data to see whether this can be done in a way that will produce an effective figure.
78. Figure 6.8 will be revised so that the 15% contour includes the point northeast of B3, using a more distinctive color for the 45% contour, and to edit the typo. We did not add the sample designations as we were concerned that the figure would be cluttered but we will reassess this as in #77. The three contours are dashed in the areas where no control is present.

Tables

79. Table 4.1. The title in the Table of Contents will be revised.
80. Table 4.6 The titles of Tables 4.6 and 4.7 will be revised. The bold text will be removed from the footnote. There is no regulatory basis for the thresholds listed.

Appendices

81. Appendix 1.2. The tidal study performed during this assessment indicates that the deeper groundwater is more stagnant than the upper zone, so we are of the opinion that the screening of the wells is appropriate. Any requirement for additional wells would be at the discretion of the RWQCB. It is not our recommendation that additional wells are necessary at this time. A paragraph regarding the storm drains and sewer lines will be added to the text of the report.
82. Appendix 1.3. Duly noted. This change will be made.

83. Appendix 4.5A. Your comments are noted and will be addressed with the subcontractor.
84. Appendix 4.10. A cover sheet regarding the USCS will be included. The title will be changed as requested. The boring logs will be reviewed and revised to address your individual comments and to be in conformance with the USCS. It is standard practice for the surface completion of a boring to reflect the surrounding material (e.g., concrete, asphalt, or soil) depending on the terrain in which the boring was drilled. At the landfill, use of soil for the shallow backfill above the bentonite meant that the surface appearance was similar to that before drilling, and that bentonite was not exposed at the surface.
85. Appendix 4.11.
- First Comment. The samples were in possession of the overnight delivery service between the times that they were relinquished by the field personnel and received by the laboratory.
- Second Comment. The samples were in possession of the overnight delivery service between the times that they were relinquished by the field personnel and received by the laboratory.
- Third Comment. Please see the Data Quality Analysis in Appendix 4.22 for a discussion regarding Mr. Pulver's comment.
- Fourth Comment. This column is left blank because it is a laboratory report default. A relative percent difference (RPD) cannot be calculated unless there is more than one laboratory control sample (LCS).
- Fifth Comment. The samples were in possession of the overnight delivery service between the times that they were relinquished by the field personnel and received by the laboratory.
- Sixth Comment. The COC that is apparently unsigned by the receiving laboratory is actually the second page of the preceding COC which is signed by the laboratory. We will request a signed copy of this second page of the COC.
- Seventh Comment. Please see the Data Quality Analysis in Appendix 4.22 for a discussion regarding Mr. Pulver's comment.
- Eighth Comment. The sample collector (Keith Etchells) who signed the "collected by" section of the COC was also supposed to complete the "relinquished by" field, but did not due to an oversight. The samples were in possession of the overnight delivery service between the times that they were relinquished by the field personnel and received by the laboratory.

Ninth Comment. The sample collector (Keith Etchells) who signed the “collected by” section of the COC was also supposed to complete the “relinquished by” field, but did not due to an oversight. The samples were in possession of the overnight delivery service between the times that they were relinquished by the field personnel and received by the laboratory. The original COC (white copy) did not accompany the samples to the laboratory so the laboratory used the COC duplicate (yellow copy) to authorize receipt. The laboratory sends the original copy of the COC (white copy) to the consultant along with the original lab report and seeing that the original COC was not available they did not send a fully authorized COC with the lab report. Therefore, the fully authorized COC will not reflect the sample designation changes requested. A signed copy of the COC has been received from the laboratory and will be included in the final report.

86. Appendix 4.12.

First Comment. The samples were in possession of the overnight delivery service between the times that they were relinquished by the field personnel and received by the laboratory.

Second Comment. The COC comment of “cool” was only to denote that the samples were placed in a ice-filled cooler. No, the preservation methods did not differ from those stated in the soil boring permit application.

87. Appendix 4.13.

First Comment. Please see the Data Quality Analysis in Appendix 4.22 for a discussion regarding Mr. Pulver’s comment.

Second Comment. Please see the Data Quality Analysis in Appendix 4.22 for a discussion regarding Mr. Pulver’s comment.

Third Comment. This column is left blank because it is a laboratory report default. A relative percent difference (RPD) cannot be calculated unless there is more than one laboratory control sample (LCS).

88. Appendix 4.14.

First Comment. The collector (Keith Etchells) who signed the COC was also supposed to note a time in the “collected by” field as well as complete the “relinquished by” field, but did not due to an oversight. The samples were in possession of the overnight delivery service between the times that they were relinquished by the field personnel and received by the laboratory.

Second Comment. No preservative refers to chemical preservatives. The samples were placed in an ice-filled cooler after collection.

Third Comment. Please see the Data Quality Analysis in Appendix 4.22 for a discussion regarding Mr. Pulver’s comment.

Fourth Comment. The collector (Keith Etchells) who signed the COC was also supposed to note a time in the "collected by" field as well as complete the "relinquished by" field, but did not due to an oversight. The samples were in possession of the overnight delivery service between the times that they were relinquished by the field personnel and received by the laboratory.

Fifth Comment. No preservative refers to chemical preservatives. The samples were placed in an ice-filled cooler after collection.

89. Appendix 4.17. The sample time is on the chain of custody.

90. Appendix 8.6. This editorial change will be made.

91. Appendix 8.7. The correct value is 10.4 µg/g. The Leadsread analysis will be rerun using the value of 10.4 µg/g instead of 10.1 µg/g, however this minor change will result in no change to the risk conclusions regarding lead.